

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	
Expanding Flexible Use of the)	GN Docket No. 18-122
3.7-4.2 GHz Band)	

COMMENTS OF NCTA – THE INTERNET & TELEVISION ASSOCIATION

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May 31, 2018

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I. INTRODUCTION AND SUMMARY

The Commission, Congress, and industry have all expressed interest in considering opportunities to expand terrestrial wireless broadband operations in C-band downlink spectrum at 3.7-4.2 GHz. In general, NCTA – The Internet & Television Association (NCTA) welcomes the Commission’s ongoing efforts to identify additional spectrum resources to support exploding consumer demand for licensed and unlicensed wireless applications. As the race to 5G reaches the C-band, however, we urge the Commission to consider carefully the impact of proposed new terrestrial wireless uses of the 3.7-4.2 GHz downlink on the extensive incumbent operations in the band today.

NCTA’s members rely on C-band spectrum to deliver programming to 100 million American households, including 51.9 million cable video customers. As the MOBILE NOW Act requires, the Commission must take stock of these existing services and assess the impact of proposed new terrestrial wireless operations on those services.¹ Many unanswered questions remain to be addressed regarding proposals for band segmentation or co-channel sharing. NCTA and its members remain concerned about the ubiquity, coverage, reliability, and cost of purported C-band alternatives, about harmful interference to existing services, and about recovering costs incurred in any transition. NCTA therefore suggests that, before issuing recommendations in any report to Congress or proposing any one specific approach to enabling expanded terrestrial wireless access to the 3.7-4.2 GHz band, the Commission insist that proponents of expanded terrestrial wireless access submit detailed technical and financial analyses. Such analyses must be sufficiently rigorous to enable the Commission to determine that:

¹ Pub. L. No. 115-141, § 605(b)-(c) (2018).

- (1) operators and programmers who rely on the 3.7-4.2 GHz band will be able to continue providing, without interruption or technological constraint, television service to millions of American households and broadband service to remote locations;
- (2) new terrestrial wireless entrants, whether adjacent- or co-channel, will not cause harmful interference to C-band services;
- (3) funds obtained from new wireless operators will be sufficient to cover the costs of the providers who rely on C-band spectrum to provide service and who will be affected by any transition; and
- (4) a well-defined process can be set up to take stock of affected parties' costs associated with enabling any new terrestrial wireless uses and to reimburse affected parties for such costs.

II. THE 3.7-4.2 GHZ BAND IS HEAVILY UTILIZED, INCLUDING FOR TELEVISION CONTENT DELIVERY

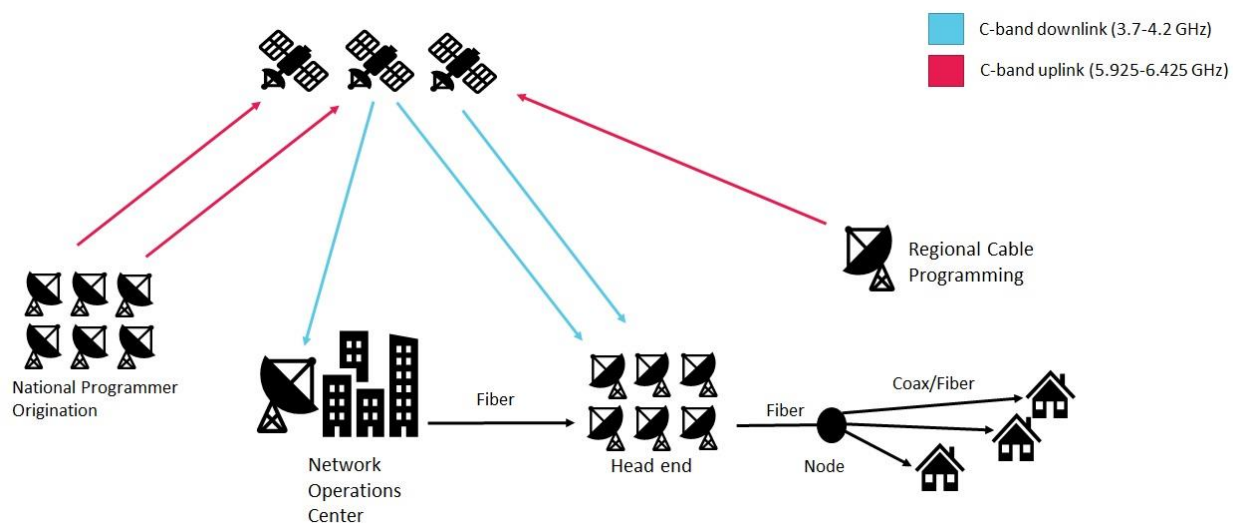
As content companies, cable operators, broadcasters, and satellite companies have made clear in the Commission's mid-band spectrum proceeding, the 3.7-4.2 GHz C-band downlink spectrum is heavily utilized for important services,² including delivering television content across the U.S. and providing broadband to remote locations. Regarding television usage, NCTA's programmer and operator members rely on C-band spectrum as a primary means of transmitting and receiving programming delivered to 100 million American households, including 51.9 million cable video customers.

Almost every national programming network and many regional networks are uplinked to C-band FSS satellites using the 5.925-6.425 GHz band and distributed using the 3.7-4.2 GHz

² The Commission will have a better picture of just how extensively the C-band is used after operators of unregistered C-band receive-only antennas register those antennas with the Commission by July 18. *See Temporary Freeze on Applications for New or Modified Fixed Satellite Service Earth Stations and Fixed Microwave Stations in the 3.7-4.2 GHz Band; 90-Day Window to File Applications for Earth Stations Currently Operating in 3.7-4.2 GHz Band*, Public Notice, DA 18-398 (rel. Apr. 19, 2018) (Registration PN). NCTA is actively encouraging its members to register their unregistered earth stations.

downlink spectrum to earth station antennas at network operations centers and cable head ends around the country, as portrayed in the diagram below.

FIGURE 1: CABLE VIDEO DISTRIBUTION



Some of NCTA's operator members have worked toward expanding the use of fiber in their networks, but this expansion has not diminished the need for C-band spectrum as a means to ingest television content. Cable operators continue to use thousands of receive-only earth station antennas to obtain from programmers the content that they distribute on to customers.

Programming networks use C-band spectrum to deliver programming to thousands of MVPD head ends, more than 1,000 broadcast affiliate stations, and over-the-top video distributors.³ Programming networks also rely on C-band satellite spectrum to deliver breaking news, sports, and other live programming from remote locations back to network operations centers where that content can be incorporated into the program stream and delivered to MVPDs and then on to customers. In addition to full-time transponder use, programmers may use additional partial transponders for these live events and late delivering program feeds.

³ Comments of the Content Companies, GN Docket No. 17-183, at 2 (filed Oct. 2, 2017) (Content Companies Comments).

Apart from content distribution, C-band incumbents—including some of NCTA’s members—also rely on C-band spectrum to deliver broadband, emergency communications, and communications in remote areas. As NCTA’s comments on the Commission’s mid-band Notice of Inquiry noted:

General Communication, Inc. states that it relies on C-band spectrum to provide long-distance, mobile, telehealth, long-distance learning, and government services, including in hard-to-reach regions of Alaska. Intelsat notes that C-band satellite operations “provide sole source connectivity in remote areas, restore communications following natural disasters, and support government communications.” In the NOI, the Commission also describes a variety of services operating in C-band spectrum, including “enabling communications on board planes and ships, . . . providing data connectivity for merchant credit card transactions, and supporting corporate data networks.”⁴

In short, C-band downlink spectrum is heavily used today for a variety of important services. As MOBILE NOW directs,⁵ the Commission must assess these existing incumbent operations and consider the possible impacts of various sharing scenarios, including both band split and co-channel sharing approaches, on such operations.

III. BAND SPLIT AND CO-CHANNEL SHARING APPROACHES DESCRIBED TO DATE DO NOT CLEARLY ARTICULATE HOW IMPORTANT EXISTING C-BAND SERVICES WILL BE PROTECTED

MOBILE NOW and the Commission’s Public Notice inquire how the Commission should assess the feasibility of shared terrestrial wireless access to the 3.7-4.2 GHz band without

⁴ Comments of NCTA – The Internet & Television Association, GN Docket No. 17-183, at 4 (filed Oct. 2, 2017) (footnotes omitted) (citing Comments of General Communication, Inc., RM-11791, at 5-11 (filed Aug. 7, 2017); Opposition of Intelsat License LLC, RM-11791, at 3 (filed Aug. 7, 2017); and *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Notice of Inquiry, 32 FCC Rcd 6373, 6376 ¶ 8 (2017).

⁵ Pub. L. No. 115-141, § 605(b)-(c) (2018).

causing harmful interference to existing users.⁶ No proposal for expanded terrestrial wireless use of 3.7-4.2 GHz submitted to date clearly articulates how new uses would protect existing services. NCTA generally supports the Commission's efforts to make available more low-, mid-, and high-band spectrum for licensed and unlicensed wireless broadband, but it should proceed with caution in the 3.7-4.2 GHz band, which is home to the important content delivery and other services described in Part II, above.

Participants in the Commission's mid-band proceeding have suggested broadly two possible approaches to expand terrestrial wireless access: (1) A band segmentation approach, in which a portion of the 500 MHz of C-band downlink spectrum would be cleared of existing C-band users to enable exclusive use of that spectrum by terrestrial wireless operations; and (2) a co-channel sharing approach in which new terrestrial wireless users would operate in the same spectrum alongside existing C-band operations, using mitigation measures to prevent harmful interference. These options implicate a variety of concerns beyond harmful interference from new services to existing licensees. In assessing the impact of these proposals on C-band incumbents, the Commission should also evaluate whether the robust suite of services operating in the band today will either be able to continue to operate in the C-band, or transition to an equivalent alternative spectrum band or transmission medium, all while ensuring continuity of service to American customers. The Commission should also identify how C-band operators

⁶ *Id.*; Office of Engineering and Technology, International, and Wireless Telecommunications Bureaus Seek Comment for Report on the Feasibility of Allowing Commercial Wireless Services, Licensed or Unlicensed, to Use or Share Use of the Frequencies Between 3.7-4.2 GHz, Public Notice, GN Docket No. 18-122, DA 18-446, at 2 (rel. May 1, 2018).

will be made whole for the disruption and costs they incur in facilitating the entry of any new users.

With respect to the band segmentation approach, the record does not yet reflect agreement on how much spectrum should be cleared for terrestrial wireless use. Proposals range from 100 megahertz⁷ to 80-100 megahertz *per major wireless operator*,⁸ which could leave as little as 100 megahertz to accommodate all existing C-band services. Accordingly, incumbent operators are unable to evaluate the precise impact on their services. Freeing up even some spectrum would likely be disruptive, but it may prove impossible to accommodate all of today's C-band services in only 100 megahertz of spectrum, particularly given that no adequate alternative has been proposed.

Several stakeholders have suggested that, to enable auction of a large amount of the 3.7-4.2 GHz band, C-band services should relocate to fiber or to other satellite spectrum.⁹ From NCTA's perspective, neither of these approaches appears to be a viable alternative to C-band. Ku-band satellite spectrum is more susceptible to signal fade than C-band frequencies,¹⁰ and high

⁷ Letter from Henry Gola, Counsel to Intelsat Corporation, to Marlene H. Dortch, Secretary, FCC, GN Docket Nos. 17-183, 18-122, at 1 (filed Apr. 20, 2018).

⁸ Letter from Jeffrey Marks, Senior Counsel - Policy and Regulatory, Nokia, to Marlene H. Dortch, Secretary, FCC, GN Docket Nos. 14-177, 15-319, 17-183, 17-258; IB Docket Nos. 97-95, 15-256; WC Docket No. 18-89; WT Docket Nos. 10-112, 17-79, at 2 (filed May 22, 2018).

⁹ *See, e.g.*, Comments of CTIA, GN Docket No. 17-183, at 4 (filed Oct. 2, 2017) (CTIA Comments); Comments of Verizon, GN Docket No. 17-183, at 17-19 (filed Oct. 2, 2017) (Verizon Comments).

¹⁰ Comments of AT&T Services, Inc., GN Docket No. 17-183, at 5, 7 (filed Oct. 2, 2017) (AT&T Comments); Content Companies Comments at 4; Comments of the Satellite Industry Association, GN Docket No. 17-183, at 15 (filed Oct. 2, 2017) (SIA Comments); Comments of SES Americom Inc., GN Docket No. 17-183, at 3 (filed Oct. 2, 2017).

transponder power is not available everywhere. This poses particular concern for the delivery of television content, as subscribers demand very high levels of reliability in their programming, no matter the weather. For this reason, even in the limited instances where some NCTA members use Ku-band frequencies, they often switch to C-band when weather events diminish quality. NCTA also understands that demand may already exceed supply for Ku-band transponders,¹¹ meaning that the Ku-band may not be able to accommodate the full complement of services that use C-band spectrum today.

Regarding fiber relocation, coverage, reliability, and cost render a wholesale transition to fiber virtually impossible. While economic realities make remote and hard-to-reach locations non-viable candidates for fiber buildout, C-band can reach any location in the satellite's footprint at the same low cost. NCTA also understands from its members that commercially available fiber networks may not have the same beneficial combination of efficiency and reliability as C-band for content delivery. In order to ensure the necessary reliability, redundant fiber lines would likely be required, multiplying the costs.¹² Finally, C-band spectrum meets a variety of needs today that simply could not be met with fiber, even if it were ubiquitous, sufficiently reliable, and affordable. For example, the programming networks that use C-band from remote locations to cover live events such as breaking news and sports would still be unable to transition to fiber. Similarly, companies that rely on C-band for back-up operations in the case of a fiber cut or natural disaster would be left without an adequate alternative.

¹¹ Comments of the American Cable Association, GN Docket No. 17-183, at 16 n.30 (filed Oct. 2, 2017) (ACA Comments); *see also* AT&T Comments at 8.

¹² Reply Comments of SES Americom, Inc., GN Docket No. 17-183, at 16 (filed Nov. 15, 2017); ACA Comments at 17 n.34.

Even assuming that a band segmentation approach was feasible, and a portion of the 3.7-4.2 GHz band could be reallocated for exclusive terrestrial wireless use, NCTA remains concerned about how its members would be made whole for the costs incurred in any transition. Each of the thousands of earth stations operated by NCTA's members would need to be outfitted with a special filter.¹³ Some legacy equipment might need to be replaced to accommodate new filtering. NCTA's members would incur labor costs to dispatch crews to install any new equipment. Costs would increase if any earth stations must be relocated or transitioned to fiber or other alternatives. At this time, none of the proponents of expanded terrestrial wireless access to the 3.7-4.2 GHz band has described in sufficient detail how much such a transition would cost (and whether a sale of these frequencies to wireless carriers would generate sufficient revenue to cover such costs) or provided sufficient detail as to how existing users would be made whole.

A small number of commenters suggest that the 3.7-4.2 GHz band could be shared co-channel with terrestrial mobile operations.¹⁴ Proponents of this approach have not filed robust technical analyses to date that would enable the Commission or C-band users to assess the potential impact of co-channel sharing on existing C-band services. The high-level technical filings on the record indicate that exclusion zones of between 30 and 75 km around earth stations would be required to protect earth stations from harmful interference from terrestrial mobile

¹³ Letter from Henry Gola, Counsel to Intelsat Corporation, to Marlene H. Dortch, Secretary, FCC, GN Docket Nos. 17-183, 18-122, at 2 (filed Apr. 23, 2018).

¹⁴ *See, e.g.*, AT&T Comments at 9-10; Comments of Comsearch, GN Docket No. 17-183, at 3-4 (filed Oct. 2, 2017) (Comsearch Comments); Comments of Federated Wireless, Inc., GN Docket No. 17-183, at 3-4 (filed Oct. 2, 2017) (Federated Wireless Comments).

users.¹⁵ But it is not clear how such mitigation measures would be enforced, particularly with respect to mobile devices, in order to ensure protection of C-band operations. Although some have suggested that a database approach—such as the Spectrum Access System (SAS) adopted for the lower-adjacent 3.5 GHz band, or a version of today’s Part 101 coordination database—could be used to enforce exclusion zones and other incumbent protection measures,¹⁶ significant questions remain regarding how the Commission might extend these existing mechanisms to ensure rigorous protections for extensive C-band services operating in the band today. For example, the 3.7-4.2 GHz band is much more extensively used by satellite operations than the 3.5 GHz band—it remains to be seen whether the SAS model could scale to accommodate the many thousands of earth station facilities operating at 3.7-4.2 GHz.

Some proponents of new terrestrial wireless uses—including those who wish to expand shared use of the band for fixed point-to-multipoint operations—also call for the Commission to discontinue its full-band, full-arc licensing policy for C-band earth stations, which remains critical for C-band users to ensure continuity of service.¹⁷ Today, an earth station is permitted to request coordination across the full 3.7-4.2 GHz band and for the full geostationary arc. This

¹⁵ Letter from Gerry Oberst, President, SES, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17-183, at 1 (filed Mar. 2, 2018) (suggesting that exclusion zones of between 65-75 km would be required); Letter from Mark Racek, Senior Director Spectrum Policy, Ericsson, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17-183, Attachment at 7 (filed Jan. 30, 2018) (suggesting exclusion zones of at least 30 km).

¹⁶ *See, e.g.*, Federated Wireless Comments at 3-4; Comsearch Comments at 3; Comments of Dynamic Spectrum Alliance, GN Docket No. 17-183, at 10 (filed Oct. 2, 2017); Comments of the Broadband Access Coalition, GN Docket No. 17-183, at 2, 4-5 (filed Oct. 2, 2017) (BAC Comments).

¹⁷ BAC Comments at 8-9; CTIA Comments at 13-14; *see also* Verizon Comments at 18.

policy provides earth station operators with important flexibility to adapt their frequency use and antenna pointing to ensure continuity of service during both planned and unplanned outages. In the case of an unexpected satellite or transponder failure, earth station operators may be required to quickly change to another transponder or point to another satellite to prevent transmission failure.¹⁸ This issue also arises at the end of a satellite's life cycle when customers must transition to a new satellite, during periodic sun transit events (when the sun is in alignment with the satellite's arc and the earth station and solar radiation interferes with reception), and in the context of live breaking news or sporting events (for which transponder usage is typically coordinated just prior to the event).¹⁹ No alternatives have been proposed by those who support limiting full-band, full-arc licensing that would meet the business continuity needs of C-band services.

IV. THE COMMISSION'S REPORT SHOULD NOT RECOMMEND ANY ONE APPROACH TO EXPANDED TERRESTRIAL WIRELESS USE OF C-BAND DOWNLINK UNTIL THE COMMISSION HAS CONSIDERED A COMPREHENSIVE RECORD

NCTA's members use C-band today for content distribution and other important services; any changes to the band will impact the entire media landscape, as well as the delivery of broadband and other services in remote areas. For this reason, NCTA urges the Commission to proceed cautiously and to develop a comprehensive record that includes detailed band segmentation and sharing proposals, technical and financial analyses, and testing, if appropriate. The Commission must have this information before recommending any one approach to enabling

¹⁸ Content Companies Comments at 3-4; SIA Comments at 26-28.

¹⁹ See SIA Comments at 28, 31; Content Companies Comments at 4.

expanded terrestrial wireless broadband use of the 3.7-4.2 GHz band in the report to Congress required by MOBILE NOW.

As described in Part III, above, many thorny and unanswered questions should be addressed before the Commission could reasonably recommend any one approach to enabling expanded terrestrial wireless access. First, the Commission should ensure that it has a sufficiently detailed understanding of the extent of existing operations to facilitate accurate evaluation of the likely impact of any proposed changes. It took an important first step by opening a filing window and encouraging operators of unregistered earth stations to register.²⁰ Second, the Commission should develop a comprehensive record examining options for expanding terrestrial wireless access to the band and insist that proponents of such access provide rigorous analysis of both the technical and financial impact of their proposals on existing C-band services. This information should be sufficiently detailed to enable the Commission to determine that:

- (1) operators and programmers who rely on the 3.7-4.2 GHz band will be able to continue providing, without interruption or technological constraint, television service to millions of American households and broadband service to remote locations;
- (2) new terrestrial wireless entrants, whether adjacent- or co-channel, will not cause harmful interference to C-band services;
- (3) funds obtained from new wireless operators will be sufficient to cover the costs of the providers who rely on C-band spectrum to provide service and who will be affected by any transition; and
- (4) a well-defined process can be set up to take stock of affected parties' costs associated with enabling any new terrestrial wireless uses and to reimburse affected parties for such costs.

²⁰ Registration PN at 3-5.

Absent a detailed record that can support the conclusions above, the Commission should not recommend a particular approach to enabling terrestrial wireless access in its report to Congress.

V. CONCLUSION

C-band spectrum remains a core part of the delivery system for television content across the country and important for broadband access in remote areas. The record developed by the Commission to date suggests that many stakeholders would like to see the 3.7-4.2 GHz band made available for widespread terrestrial wireless broadband use. However, proponents of introducing new terrestrial wireless services have not provided sufficient detail for incumbent users to assess the potential impact of such proposals on important existing operations. It is not yet clear: (1) how much spectrum might remain available to accommodate today's robust C-band ecosystem; (2) whether equivalent alternatives to C-band exist that could accommodate some of today's C-band services; (3) whether new users can protect incumbents from harmful interference; (4) how much a transition would cost; or (5) how incumbent users would be made whole for costs incurred in accommodating any new wireless services. As the Commission prepares the report to Congress required by MOBILE NOW and moves forward in parallel with a rulemaking, NCTA urges the Commission to develop a comprehensive record, including technical and economic analysis of proposals for new terrestrial wireless entry, before recommending any one approach to enabling such uses.

Respectfully submitted,

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